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Analyses of Psychological Aspects of Attractiveness in Feminized and Juvenilized Japanese Faces[1]

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Averaged Japanese faces were quantitatively transformed into feminized or juvenilized faces by morphing. Fifty-six university students (28 males and 28 females) evaluated the facial attractiveness, and the attractiveness score was compared between the feminized and the juvenilized faces. As a result, for female faces we found that juvenilization was preferred to feminization, while the optimal transformation ratio producing high attractiveness was limited to a narrower range for feminization than for juvenilization. However, there was no large difference between the juvenilized and the feminized faces in male attractiveness. Thus, the present study indicates that feminization and juvenilization have different psychological effects on the attractiveness of female faces in spite of the similarity between the average young adult female face and child face. In contrast, juvenilization and feminization have the same effect on the attractiveness of male faces, while male faces are largely different from female and child faces in both physical and psychological aspects.

Key words: facial attractiveness, average face, feminized or juvenilized faces

Introduction

Recent works on facial attractiveness have suggested that individuals would show very high agreement in facial attractiveness ratings. For example, previous researches have revealed infants' visually preference for faces that adults find attractive (Langlois, Roggman, Casey, Ritter, Reiser-Danner, & Jenkins, 1987; Rubenstein, Kalakanis, & Langlois, 1999) and cross-cultural consistency in attractiveness data (Rhodes, Yoshikawa, Jeffery, Clark, Lee, McKay, & Akamatsu, 2001; Jones & Hill, 1993). These findings suggest that some standards of beauty may reflect biologically based preferences that might have been shaped by human evolution.

As some candidates for biologically based preference, previous research has mainly concentrated on two characteristics of faces. They are symmetry and averageness. When symmetry is increased artificially, attractiveness generally increases (Perrett, Burt, Penton-Voak, Lee, Rowland, & Edwards, 1999; Rhodes, Proffit, Grady, & Sumich, 1998), and average faces generated by computer graphics are known to be more optimally attractive than almost all the component faces (Langlois & Roggman, 1990). Some studies have implied that these facial traits

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reflect an aspect of mate quality and thus they may be adaptations to the problem of mate choice (See Rhodes et al., 1998).

From a biological viewpoint, it can be assumed that enhancing the sexual dimorphism of human faces should raise attractiveness such as masculinized male faces and feminized female faces (See Barber, 1995). However, currently several studies on facial attractiveness have indicated that feminization rather than sex exaggeration in itself tends to be attractive even on male faces (Perrett, Lee, Penton-Voak, Rowland, Yoshikawa, Burt, Henzi, Castles, & Akamatsu, 1998; Rhodes, Hickford, & Jeffery, 2000). Perrett et al. (1998) explained the preference of females for feminized faces in terms of the personality attributes induced by such faces. For instance, the femininity in male faces may be associated with a collection of characteristics, such as warmth, honesty, and a willingness to invest in offspring, while sex exaggerating male faces elicit negative personality attributions (coldness, dominance, dishonesty, etc). He also argued that feminized faces are perceived as younger, encouraging neotenous appearances.

Male faces change largely as they grow, whereas female faces physically change less and therefore remain relatively child-like. Furthermore female faces actually resemble children's faces in our imagination (Yamaguchi & Oda, 1996). There are many implications on the positive association between facial attractiveness and child-like appearance (see Jones, 1995). So, in the present study, we created feminized or juvenilized facial images by morphing and compared the attractiveness score between feminized and juvenilized faces. Then we tried to investigate quantitatively whether or not juvenilization and feminization have the same influence on the attractiveness of male and female faces.

Method

Participants. Fifty-six (28 for each sex) Japanese university students participated in the experiment.

Stimulus faces. First, we created average faces of Japanese adult male, adult female, boy, and girl faces (Figure 1). The original face models were Japanese males and females aged 20 - 30, and Japanese boys and girls aged 6-7. In order to generate each average face, 20 original facial color pictures in the frontal view and with a neutral expression were digitized. FUTON system (See Kamachi, Bruce, Mukaida, Gyoba, Yoshikawa, & Akamatsu, 2001) was used to create all composite images. The sizes of all images were matched by standardization of the inter-pupil distance. The textures of all of the faces were also standardized in order to primarily investigate the effects of shape variations on facial attractiveness.

To generate male exaggerated or interpolated images, we morphed between adult male and adult female, and between adult male and boy average faces in 10% morphing ratio steps (resulting 21 male composite faces). Likewise, to generate female exaggerated or interpolated images, we morphed between adult female and adult male, or between adult female and girl average faces in the same steps (21 female composite faces). These composite images were trimmed using an oval frame and printed out in the size of A6 (105 × 148mm) with a high-

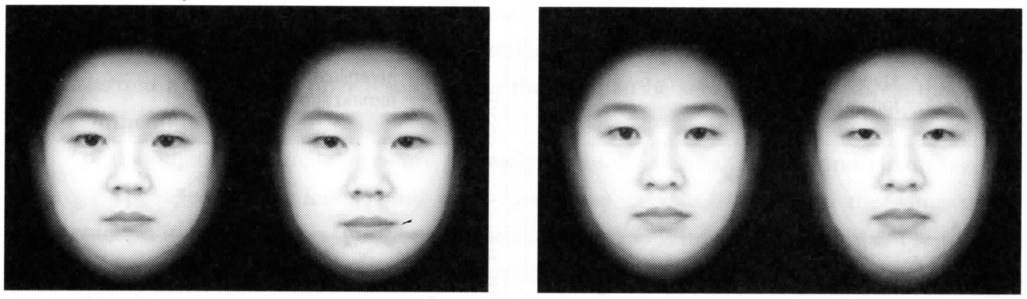

Figure 1. The averaged faces (leftmost; girl, left; boy, right; adult female, rightmost; adult male).

quality color printer (Epson MP840C). These stimulus faces were put into card-cases of A6 size and presented to the participants.

Procedure. All of the participants were instructed to select and rank the three most attractive male and female faces separately. The reason why the ranking method was employed instead of the rating methods was that all of the rendered faces were relatively similar to each other in appearance, so relative and simultaneous comparisons was needed in order to measure the subtle difference of recognized attractiveness. The participants were divided into two groups of equal numbers of males and females. One group's participants (14 males and 14 females) were asked to rank the facial attractiveness of 11 male images and 11 female images separately, which were transformed in 20% morphing ratio steps. The other group's participants were asked to judge another 11 male images and 11 female images, which were also transformed in 20% ratio steps but with morphing ratios that differed from the first group. Consequently, we collected attractiveness data on images varying at 10% ratio intervals over all of the participants. Note that adult male average and adult female average were presented to all participants in order to check the homogeneity of the two groups statistically. The order in which male or female faces were seen was counterbalanced across the participants.

Results

The faces that the participants selected as the most, the second most, and the third most attractive were given 3, 2, and 1 point, respectively. We calculated the total points of each face as attractiveness scores and plotted the scores as a function of feminization or juvenilization morphing ratio (Figure 2).

As can be seen from Fig.2a, the juvenilized female faces are generally more attractive than the feminized faces ($CR = 7.14$, $p < .01$). Moreover, the function of attractiveness is significantly sharper for feminization (almost distributing within the range of 0% to 30%), compared to that for juvenilization ($F_{(233,\ 101)} = 2.81$, $p < .01$).

In contrast, Fig.2b indicates that there is no significant difference between juvenilization and feminization in the attractiveness function of the male faces, either in the overall level of the scores

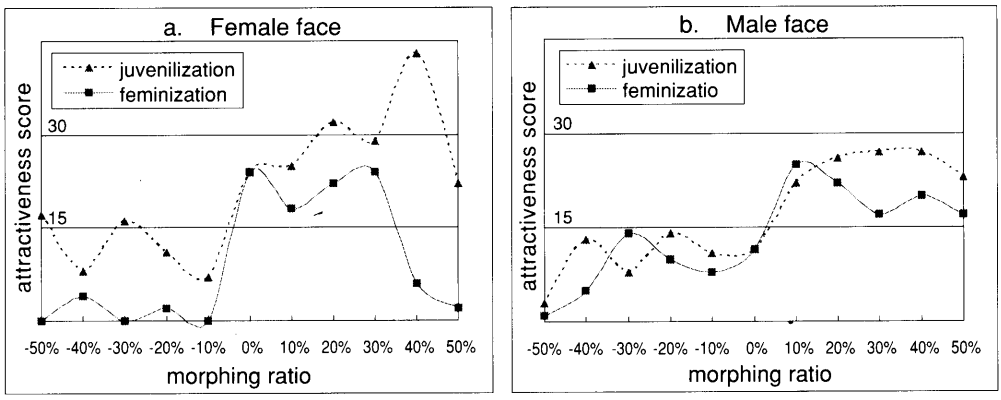

Figure 2. The attractiveness scores as functions of the morphing ratios. Solid line shows feminization, and dotted one indicates juvenilization. Horizontal axis shows morphing ratio. Plus percentage means increasing feminization or juvenilization, and minus percentage indicates opposite direction of feminization or juvenilization. Vertical axis shows attractiveness score.

($CR = 1.85$, *ns*) or in the shape of the function ($F_{(184.5,\ 149.5)} = 1.13$, *ns*). While both of the functions are smooth, the feminized male faces around 10% or the juvenilized ones around 30% are mostly preferred.

Discussion

As for female faces, we found that the juvenilized faces are preferred to the feminized faces. Juvenilization produces attractiveness for a wider range of morphing while the effect of feminization is limited to a particular ratio of morphing. In contrast, for male faces, no significant difference was found between feminization and juvenilization. These results indicate that juvenilization increase the attractiveness of female faces more than feminization, while the two kinds of transformation do not affect differently the attractiveness of male faces.

Youthfulness has been reported as an important factor of attractiveness (Cunningham, 1986) and as a potential factor elicited by the feminization of images (Meyer & Quong, 1999). It has been also suggested that childish faces lead to a feeling of cuteness, which may in turn cause the feeling of protectiveness. Moreover, some researchers reported that female faces and child faces resemble each other both physically (Montague, 1989; Zebrowitz, 1997) and in our imagination (Yamaguchi & Oda, 1996). Our previous study on the impressions of the morphed faces by the semantic differential method has indicated that the averaged female face is located close to the averaged child face in the extracted factor spaces (Ishi, Gyoba, Kamachi, Mukaida, & Akamatsu, 2001).

These facts might suggest the possibility of common characteristics or the same psychological meanings between attractive childish faces and feminized faces. However the present analysis indicates that feminized and juvenilized properties have different psychological effects on the attractiveness of female faces. It is interesting that we are differently sensitive to juvenilization or

feminization in female faces in spite of the similarity between averaged adult female and child faces. Therefore, the evaluative or discriminative perception of female faces might be characterized by the much finer resolution, so that we can be sensitive to any subtle differences between them.

On the other hand, male faces are generally dissimilar to adult female and child faces. So, in a global aspect, adult female and child faces may be categorized into the same group, differentiated from male faces. Furthermore, the present results reveal that we are not sensitive to the difference between feminization and juvenilization in the case of male faces. So, it is highly likely that the evaluative perception of male faces might have low or coarse resolution.

Finally, in the present study we did not analyze separately the data of male participants and those of female participants because the number of the participants was insufficient for the 2(male or female faces) x 2(male or female participants) analysis. So in future study, it is necessary to increase the number of participants, and to analyze carefully the interaction effect between the sex of faces and the sex of participants.

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